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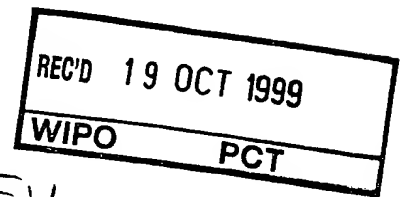
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I, KIM MARSHALL, MANAGER PATENT OPERATIONS hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PQ 2249 for a patent by BARTLEM PTY LTD filed on 16 August 1999.



WITNESS my hand this
Eleventh day of October 1999

KIM MARSHALL
MANAGER PATENT OPERATIONS

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IMPROVEMENTS IN AND RELATING TO GARDEN REFUSE SHREDDERS

This invention relates to garden refuse shredders and in particular it relates to improvements to electrically operated garden shredders.

5 In our earlier provisional patent specifications Nos. PP8057 and PP8981 relating to garden refuse shredders we described a garden refuse shredder assembly of simple and effective form which utilises a rotary chipper assembly supported on the output shaft of a vertical shaft petrol engine. It has been found that this shredding arrangement works effectively in use in terms of its ability to shred various
10 types of refuse and its ability to operate without tangling of stringy matter around the drive shaft.

This invention has been devised with a view to providing a similar shredder which is powered by an electric motor and which retains features of the petrol engine driven shredders described in our earlier applications.

15 Garden refuse shredders and other electrically driven appliances are operated by electric motors which have the potential to be switched on and off remotely from the implement and without knowledge of the user. When operated such implements mostly operate silently. This can lead to inadvertent contact with a
active parts of the implement and consequent injury to a user. This is particularly so
20 in the case of refuse shredders whose operation when shredding may cause an operator to wear ear muffs and where the spinning chipper assembly if contacted may cause instant serious injury.

While it is possible to provide override switches and the like to minimise such accidental occurrences, it is difficult to shield against careless operating practices
25 while maintaining simplicity and reliability of the apparatus.

The present invention aims to alleviate such disadvantages.

This invention in one aspect resides broadly in a garden refuse shredder of the type having a rotary chipper assembly supported on the output shaft of an electric motor for rotation across the outlet from a refuse feed chute such that refuse fed
5 therethrough will engage the rotary chipper assembly to be shredded, wherein the rotary shredder assembly includes a friction brake biased to an engaged attitude so as to cause the rotary chipper assembly to slow quickly to a stopped position once electrical power to the driving motor has ceased, and a manual on/off control associated with an onboard electrical switch which controls the supply of electricity to
10 the motor such that when the control is moved to the on position for supplying electricity to the motor the brake is maintained in a disengaged position and when the control is moved to the off position the brake is freed for stopping the rotary chipper assembly.

Suitably the brake is a single shoe brake carried on a lever for movement to
15 and from its engaged attitude and co-operable with a switch in its disengaged position to supply electricity to the motor. The brake is suitably arranged as a leading shoe brake such that the effort to operate the brake effectively is reduced.

The rotary chipper assembly may also be supported within a shredder housing which is opened to provide service access to the rotary chipper assembly
20 and suitably a latching arrangement is provided for holding the brake lever or other manual on/off control when in the on position in a blocking position blocking the opening of the shredder housing.

The rotary chipper assembly may be supported in a volute shaped housing and be provided with wind vanes for creating an air flow therethrough from the refuse
25 inlet to the outlet from the shredder housing.

A barrier wall may be provided about the output shaft of the motor as a guard against elongate fibrous articles becoming entwined about the shaft. Cutters mounted on the rotor of the rotary chipper assembly and arranged to pass across fixed anvils may be provided to disrupt fibrous articles that pass toward the output shaft also with a view to preventing elongate fibrous articles becoming entwined about the shaft and in a further aspect of this invention the cutters are suitably in the form of hardened plates extending upwardly through slots through the rotor to pass close to the fixed anvils. Each plate may be welded to a mounting flange which is bolted to the underside of the rotor and preferably with bolts which trail the plate.

10 In order that this invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate a typical embodiment of the present invention and wherein:-

FIG. 1 illustrates an electrically operated shredder;
in an operative mode;

15 FIG. 2 is a corresponding view but in an inoperative mode;

FIG. 3 illustrates the shredder in an open servicing mode;

FIG. 4 is a similar view to Fig. 3 but shown with the rotor removed;

FIG. 5 is a top view of the rotary chipper assembly, and

FIG. 6 is an underneath view of the brake assembly.

20 The garden refuse shredder assembly 10 illustrated in the drawings has a rotary chipper assembly 11, as illustrated in Fig. 5 supported in a housing 12 and driven by an electric motor 13. An inlet chute 14 is provided at the rear of the housing for entry of garden refuse and an outlet chute 15 is provided at the front of the housing through which shredded material is discharged.

In this embodiment, the housing 12 is a two part housing having an upper part 20 pivotally connected by pivots 21 to a base part 22 such that the upper part 20 may be opened as shown in Fig. 3 and 4 to provide access to the rotary chipper assembly 11. Normally the housing parts are retained in their closed attitude by a pair of wing nuts which bolt the upper part 20 to the base part.22.

Referring to Fig. 4 it will be seen that the rotary chipper assembly 11 is contained within a volute shaped housing 24 formed with an expanding discharge chute 25 extending to the outlet 15. Fig. 4 also illustrates the inlet 26 for refuse to be shredded and the anvil 27 which is bolted to the trailing edge of the inlet 26 and which chipper blades 28 of the rotary chipper assembly 11 co-operate to shear refuse fed through the inlet 26.

As shown in Fig. 3 the base part 22 is provided with an upstanding pin 30 which passes through a complementary aperture 33 in the upper housing portion 20 when the housing is closed. The upper end 31 of the pin 30 is then exposed above the upper housing 20 as illustrated in Figs. 1 and 2.

The rotary chipper assembly 11 is provided with a mounting hub 35 which receives the keyed output shaft of the electric motor 13. The upper portion of the hub 35 extends upwardly above the housing 20 into a cavity formed by an inverted channel shaped motor mounting bracket 36. The motor mounting bracket supports a brake lever 37 which carries a brake pad 38 and tension spring 39 which biases the brake pad 38 into engagement with the upper portion of the hub 35.

The brake lever 37 extends forwardly through the front flange 40 of the motor bracket 36 and beyond the exposed upper end 31 of the pin 30 which projects through the housing 20. An on/off switch 41 is also carried on the motor mounting bracket so as to co-operate with the brake lever such that when the brake lever is

disengaged from the hub 35 and held in the "ON" position, it will actuate the switch 41 to an on position such that external electrical power supplied to the shredder will be switched to the motor 13.

When the lever 37 returns to the engaged position, it releases from the switch 41 which becomes open circuit so as to prevent supply of electricity to the motor 13. Once disengaged from an "ON" position, the biasing of the lever 37 will urge the brake pad 38 into braking contact with the hub 35 to brake the rotor assembly 11 to a standstill in a relatively short space of time, such as a matter of seconds.

The end 45 of the lever 37 which is exposed above the housing part 20 forms an on/off control switch for the shredder and it is adapted to be retained in the "ON" position by engaging it with the exposed upper end 31 of the pin 30. For this purpose, the upper end 31 of the pin 30 is waisted at 50 and the end 45 of the lever is provided with a keyhole slot 51 whereby the end portion 45 may be captively engaged with the upper end 31 of the pin 30 and held therein by its spring bias.

When so engaged, the switch 41 is maintained closed and power is supplied to the motor 30. When the lever end 45 is released from the pin end 31, the spring 39 will pull the lever 37 to the braking position stopping power supply to the motor and at the same time braking the rotor to a standstill.

Should an operator want to gain access to the rotor assembly 11, the operator may undo the wing nuts 42 with a view to pivoting the upper part 20 of the housing 12 to the open position. This may be achieved provided the on/off lever 37 is not engaged about the upper end of the pin 30. If it is so engaged and the electric motor is powered, then captive engagement of the lever end 45 with the pin end 31 will prevent the upper housing part 20 being pivoted to its open position. Thus the

housing cannot be opened to gain access to the rotor assembly 11 unless the lever 25 is in the off position.

Accordingly it will not be possible to gain access to the rotor assembly 11 until the power supply to the motor 13 has been disrupted and the rotor has been braked.

5 Referring to Fig. 6 it will be seen that the brake lever 37 is arranged with the pivot mounting at a leading position relative to the rotation of the hub 35 such that the brake assembly is a leading shoe brake assembly which provides a self servo effect to assist actuation by the tension spring 39.

It will also be seen from the drawings that the rotor assembly 11 operates in
10 the volute shaped housing and is provided with fan blades 61 adjacent the apertures 62 in front of the chipper blades 28. The fan blades induce a draft through the feed chute 14 and through the outlet 15 to assist in through flow and discharge of shredded material.

It will be further seen that an annular barrier wall 63 is formed around the
15 output shaft 64 of the motor 13 so as to shroud the hub 35. Fixed circular anvils which are preferably serrated and constituted by the heads of Allen head bolts 65 are mounted adjacent the barrier wall 63 and complementary L-shaped cutting blades 66 extend through slots 67 in the rotor 11. The blades 66 are welded to mounting plates
which are bolted to the rotor 11 by trailing bolts 69. The L-shaped cutters 66 pass
20 closely over the outside and lower end of the circular anvils 65 so as to cut up any fibrous material which may pass through the inlet 26 and move inwards above the rotor 11.

In the illustrated embodiment the outlet 15 is provided with a deflector 70 which deflects discharged material towards the ground. The deflector however may

be pivoted to an inoperative position so as to permit a catcher to be engaged with the outlet to receive shredded material.

In operation the upper end of the inlet chute 14 is normally covered by a safety flap which does not prevent flow of air induced by the low pressure created by the fan blade 61. Thus once operating, there is a significant air flow induced in the inlet chute to assist feed of material to the cutter assembly and from the outlet to assist in discharge of shredded material.

As the material is fed through the inlet, it is engaged between the anvil.27 and a chipper blades 28 and chipped. It is then flung outwardly and discharged with the aid of the induced draft. This operation can only occur when the lever 45 is engaged about the pin 30 as illustrated in Fig. 1. If the operator desires to service the rotor 11, the upper part of the housing 20 cannot be opened until the lever 45 has been freed from the pin 30 for movement to the braking position. Thereafter the wing nuts 42 can be released to enable the housing parts to be opened. A further accessible master switch may be provided if desired to provide an operator with a direct means of switching the power supplied to the shredder assembly 10 on or off. This may be accommodated on the handle of the shredder assembly 10 or placed elsewhere as desired.

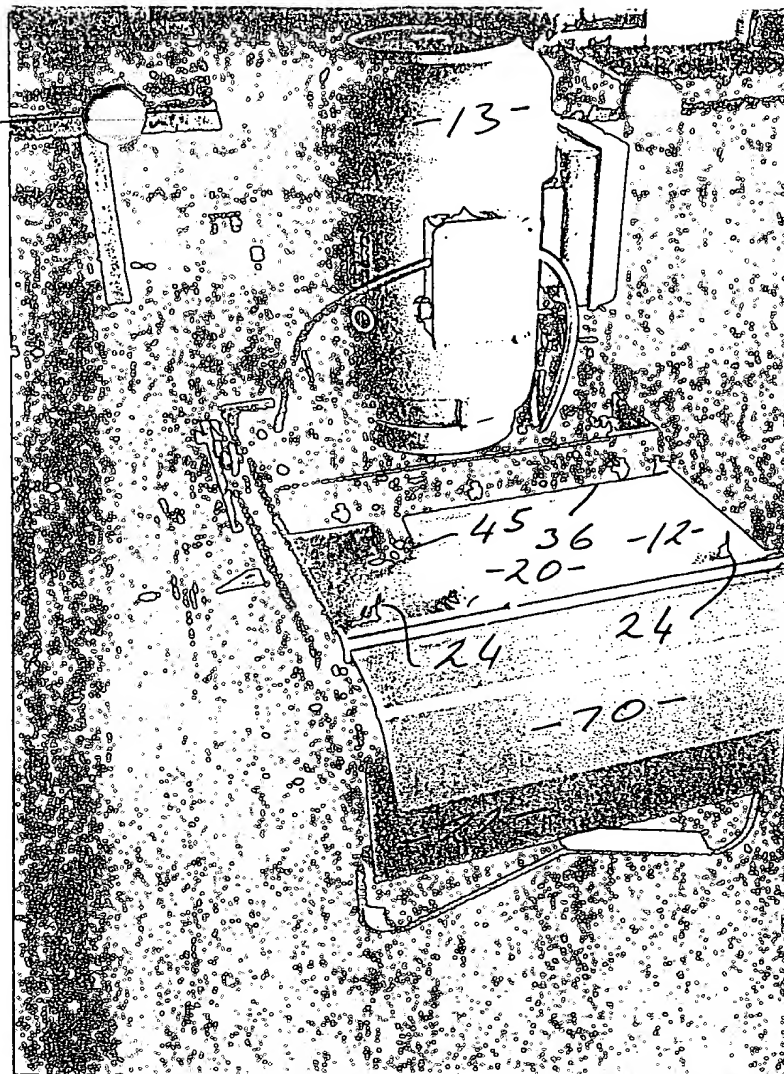
It will of course be realised that the above has been given by way of illustrative embodiment of the invention, all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of the invention as herein set forth.

DATED THIS Sixteenth DAY OF August 1999.

BARTLEM PTY LTD

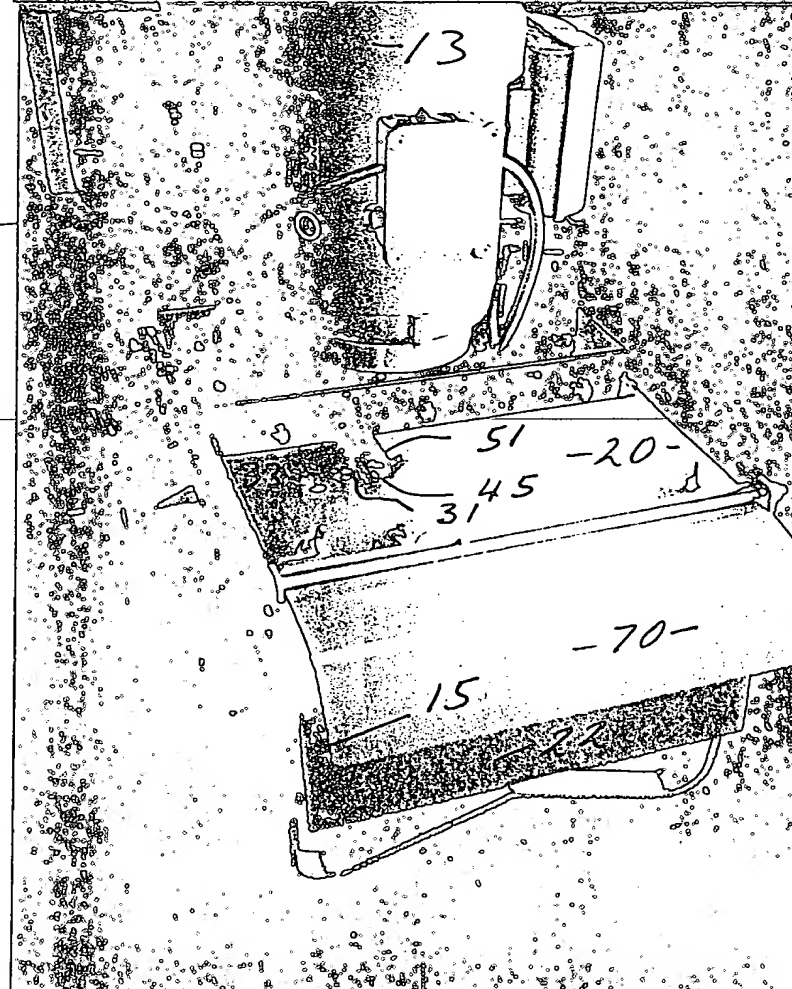
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Fig. 1.



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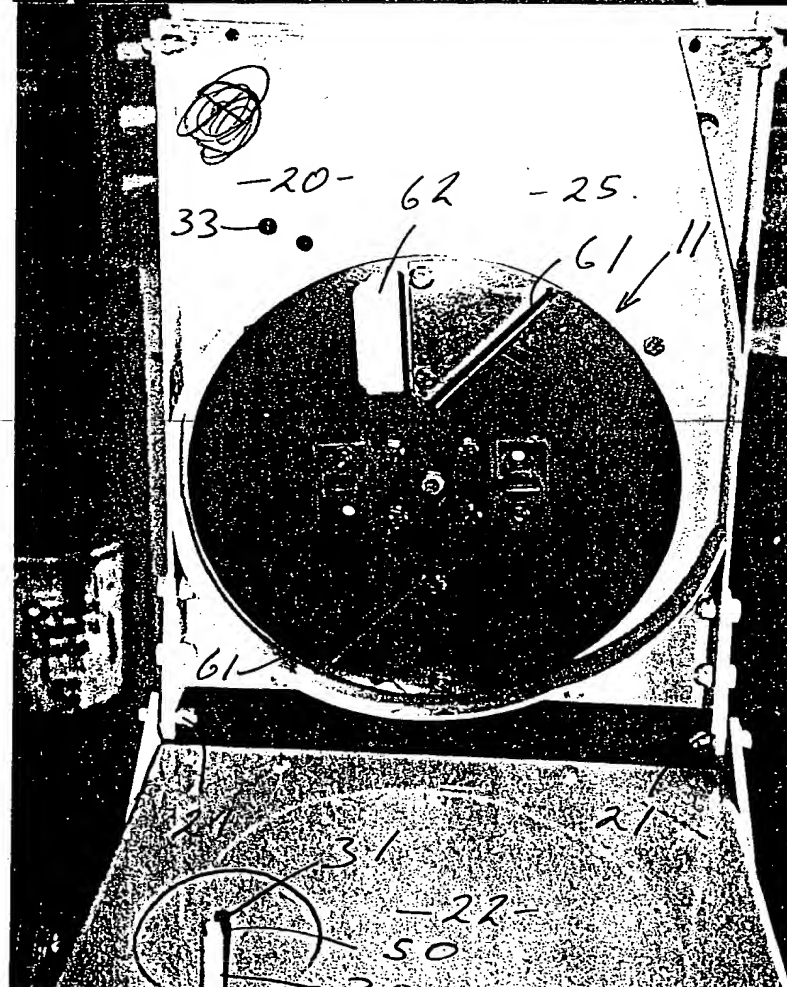
Fig. 2.



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Fig. 4.

- 21



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Fig. 3

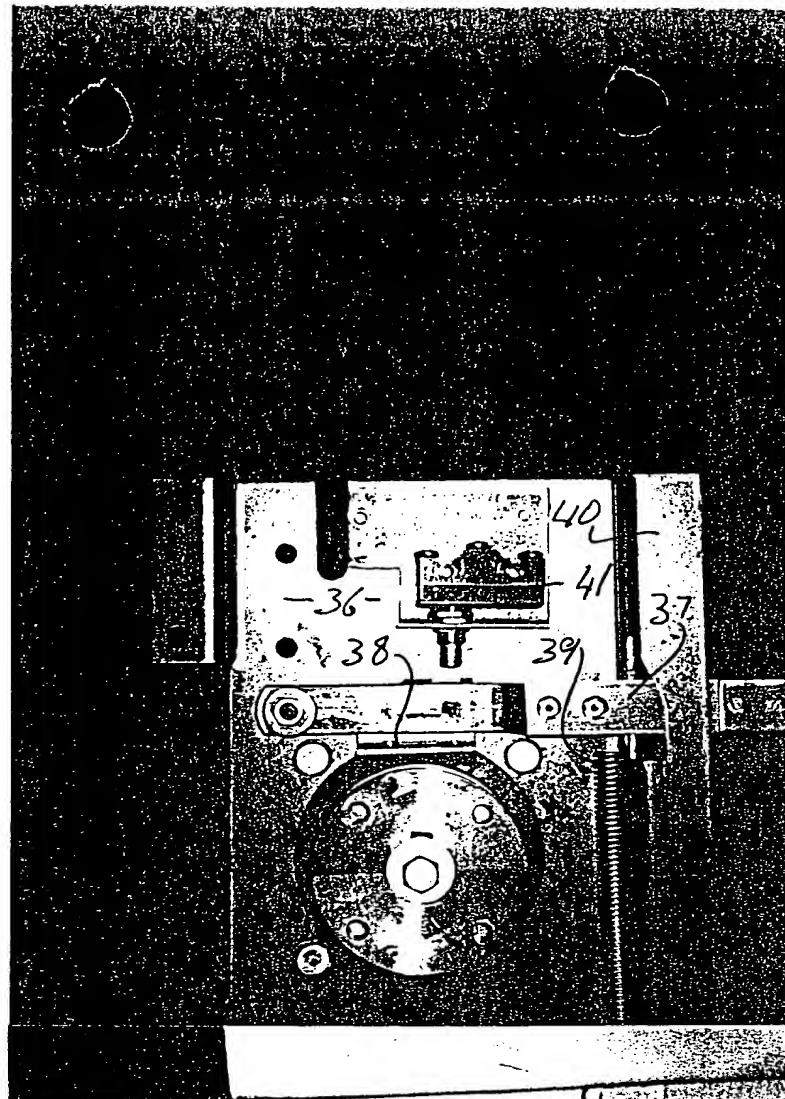


Fig. 6.

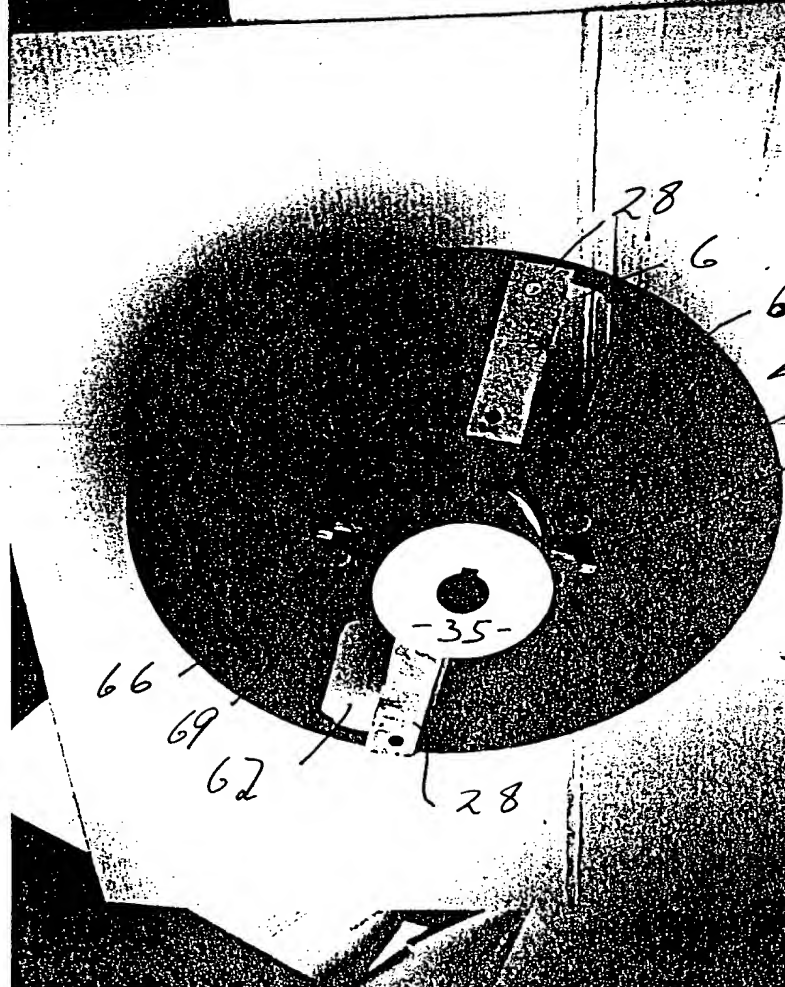


Fig. 5.

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